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ABSTRACT

This national cross-sectional survey provides data on the long-term outcomes of vocational education. Chapter 1 offers background information and describes the sample--1,539 people between the ages of 20 and 34, one-half of whom had taken vocational education programs in high school. Chapter 2 describes the broad context within which the labor market effects of vocational education take place, with emphasis on the actions of the labor market and the factors that influence individual decisions. The chapter concludes with an explanation of long-term earnings profiles, or life-cycle earnings progressions, by means of which the earnings outcomes of vocational education are described. Findings, provided in chapter 3, are grouped into four categories: earnings, employment, education, and aspirations. These results are presented: vocational graduates overall enjoy a long-term earnings advantage over graduates of a general curriculum; they are likely to experience less unemployment than graduates from a general curriculum; about two-thirds are expected to be in jobs of the same kind 5 years later; and they are somewhat more likely to say they need further schooling to obtain desired jobs. (An appendix describes data collection and methods of analysis.) (YLB)

Research and Development Series No. 246

THE LONG-TERM EFFECTS OF VOCATIONAL EDUCATION: EARNINGS, EMPLOYMENT, EDUCATION, AND ASPIRATIONS

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1984

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FOREWORD

The long-term effects of participating in vocational education at the secondary and postsecondary levels are of interest to planners, policymakers, researchers, and practitioners at the federal, state, and local levels. Empirical evidence of the long-range effects of publicly funded programs can furnish a basis for informed decision making. *The Long-Term Effects of Vocational Education* provides such information about individuals up to fifteen years after their high school graduation.

This report answers such questions as: *What are the long-term effects of participating in vocational education at the secondary and postsecondary levels? How do former vocational education students feel about their job preparation in relation to their career? How do the earnings of secondary vocational graduates compare with those of graduates of other programs?*

This report includes the results of an analysis of a new national database, the Younger Adult Workers. The Gallup Organization determined the final sample and field-tested and administered the questionnaire. Mitchell E. Cohen, Senior Researcher at the Gallup Organization, supervised the work performed under this subcontract.

Funding for the study was provided by the Office of Vocational and Adult Education, U.S. Department of Education.

This project was conducted in the Evaluation and Policy Division of the National Center for Research in Vocational Education. Donna M. Mertens, Project Director, and John Gardner, Research Specialist, had the primary responsibility for data analysis and prepared the original report. Other staff members who assisted in the early phases of the project include Jill Russell, Lee Rasmussen, and Mark Whitmore. Computer programming was provided by Marta Fisch, Ken Kutler, and Jeff Parrott. This report was organized and written by Jeanne Desy. The project staff wishes to thank Priscilla Ciulla and Mary Beth Dauner who assisted with the numerous details of the manuscript preparation.

Special thanks go to the reviewers of an earlier version of this report. The comments of N. L. McCaslin, Morgan Lewis, and William Hull of the National Center for Research in Vocational Education; John T. Grasso of West Virginia University; and Robert Meyer of the Urban Institute were most useful in enhancing the quality of the final report. Final editing of this publication was performed by Judy Balogh of the National Center's editorial staff.

Robert E. Taylor
Executive Director
National Center for Research
in Vocational Education

EXECUTIVE SUMMARY

This study was conceived in response to the controversy over the long-term effects of high school vocational education. Past studies of short-term effects have found evidence that vocational education students have certain advantages in the labor market in the first years after leaving high school. In response, critics have contended that, because they prepare students for immediate employment, vocational programs limit longer-term opportunities. Young people are tracked, they allege, into programs that prepare them for jobs with low status, low pay, and no opportunity for future advancement.

Heretofore, it has been difficult to determine whether or not these claims were valid because of the scarcity of data on the long-term experience of vocational graduates. For this reason, the National Center for Research in Vocational Education, with sponsorship by the Office of Vocational and Adult Education, U.S. Department of Education, commissioned a national cross-sectional survey. This survey was designed to provide data on the long-term outcomes of vocational education, with emphasis on an array of labor market effects. The 1,539 people randomly sampled for the survey were between the ages of twenty and thirty-four; all were in the civilian labor force at the time. The survey was so designed that one-half of those in the sample had taken vocational education programs in high school and one-half had not. The analysis of this data first appeared in *Vocational Education and the Younger Adult Worker* (Mertens and Gardner 1981). A summary of the findings was published in the *Journal of Vocational Education Research* (Mertens and Gardner 1983).

The results of this study refute the allegation that graduates of vocational programs work in low-prestige, low-paying jobs. In general, the jobs vocational graduates hold are not low in status and pay, but in the middle range of both categories. Vocational education has a positive effect on earnings for male graduates with marketing and trade/industry specialties, and female graduates who specialize in business/office or trade/industry. Higher earnings are not universal among vocational graduates; as in the labor force at large, women have consistently lower earnings than men. Those women surveyed who had specialized in agriculture, health, and home economics (grouped together for analysis in this study as the category "other") had consistently lower earnings than graduates of a general curriculum.

Overall earnings are affected by rates of employment as well as pay. Vocational graduates in general experience less unemployment; this effect is especially strong for women in business/office and marketing. Vocational education also has an indirect effect on earnings through its influence on postsecondary education. High school vocational education is associated with completion of nontraditional postsecondary training and educational programs, such as apprenticeship and employer-sponsored training, and these programs are associated with higher earnings.

This study was not designed to examine training-related placement, which is sometimes used as an index of the effectiveness of vocational education. It did, however, gather data on the extent to which graduates use on their jobs the skills they learned in vocational education—an indicator of training-related placement. Overall, both men and women reported moderate to high use of these skills. This may be related to their equally high levels

of satisfaction with their high school vocational programs.

Other findings of the study that should be of special interest are presented next under the categories of earnings, employment, education, and aspiration. It should be noted that a finding in one category may be relevant to findings in another in the same way that employment and education, as stated above, affect earnings.

Earnings

- For the first regular full-time job, earnings are determined primarily by the level of education. Vocational and general curriculum graduates earn approximately the same wages on their first jobs.
- In terms of the earnings in the current or most recent job, both male and female vocational graduates have higher wages than graduates of a general curriculum. Graduates of an academic curriculum, except for minority women, earn more per hour than either of these groups.
- Men in all specialties, with the exception of business/office, have a long-term earnings advantage over general curriculum graduates.
- Both men and women who specialize in trade/industry earn more than general curriculum graduates.
- Within most program areas, men earn more than women, and white graduates earn more than minority graduates.
- Graduates in business/office and marketing are less likely to work in unionized jobs; this indirectly reduces earnings for those in these fields.
- Men with increased work experience, longer job tenure, and unionized jobs tend to have higher earnings.
- On the postsecondary level, completion of proprietary school programs leads to higher weekly earnings for men than completion of programs at public community colleges or technical institutes.

Employment

- Overall, vocational graduates experience less unemployment than general curriculum graduates; the reduction in unemployment is greater for men than for women.
- Women from all vocational program areas share the same likelihood of employment.
- For both men and women, more total experience in the labor force is strongly associated with less recent unemployment.
- About 60 percent of vocational students report using the skills they learned in high school on the job, either a fair amount or a great deal.
- Completion of postsecondary vocational or technical programs is associated with greater on-the-job use of the skills learned in high school.
- Women who specialize in business/office and men who specialize in trade/industry are more likely than other vocational students to find employment that uses their skills on their first jobs.
- Vocational graduates are more likely to find first jobs in which they use their skills when their high school programs included direct placement assistance and training in job search skills.
- In general, vocational graduates are employed in occupations related to their specialties. Agriculture tends to lead to farming and agribusiness, marketing to sales or clerical work, business/office to managerial or clerical jobs, and trade/industry to craft or operative work.
- Male vocational graduates are more likely than graduates of general programs to work in craft or service jobs and less likely to hold white-collar positions.

- Self-employment is more common among general and academic graduates than among vocational graduates.
- Women from business/office programs tend to work in jobs with higher status as determined by the Duncan Status Attainment Scale, and women from trade/industry programs tend to work in jobs with lower status.
- Job status for men from all vocational programs except marketing is higher than for general curriculum students.

Education

- Graduates in business/office, marketing, and trade/industry express much more satisfaction with their preparation for the job search than do their counterparts from a general curriculum.
- After experience in the labor force, vocational graduates are more likely than graduates of a general curriculum to say that they would choose the same curriculum again.
- Men who specialize in marketing are much more likely both to attend and to complete public postsecondary vocational programs than graduates of general programs; they are also more likely to hold jobs in which they use the skills learned in these programs.
- Men in agriculture, health, and home economics (all encompassed in the vocational category "other") are much less likely to complete proprietary vocational school programs.
- Women from trade/industry programs are much more likely than their peers from a general curriculum to attend and complete proprietary school programs, and to use the skills learned there on the job.
- For both men and women, completion of four-year college or university programs and advanced degrees is significantly associated with graduation from a high school academic curriculum and with a high socioeconomic status (SES) background.
- Graduates of trade/industry programs—both male and female—have a strong tendency to participate in and complete apprenticeship programs.
- Participation in and completion of employer-sponsored training programs are more likely for men from marketing or trade/industry programs, for women from marketing, and for graduates of high school academic programs than for other graduates.
- Graduates of academic curricula are less likely to complete government-sponsored training programs as are women in the "other" vocational group.

Aspirations

- For both men and women, the expectation of holding the same job five years from now is associated with being white, having longer job tenure and higher pay, and completing four years of college.
- For women, more labor force experience, lower SES, and completion of either of two other types of postsecondary schooling—employer-sponsored training or public community college—are also associated with the expectation of remaining on the current job for five years. For men, this expectation is additionally associated with graduation from high school agricultural, business/office, or trade/industry programs.
- Vocational graduates most often aspire to jobs in the professional and clerical areas. However, fewer vocational graduates than graduates of other curricula aspire to professional jobs.
- Vocational graduates are somewhat more likely than other graduates to say that they need further schooling in order to obtain the jobs they want. Men from

trade/industry programs are especially likely to express this aspiration.

- Except for men from marketing programs, vocational graduates aspire to fewer years of additional training or education than do graduates of a general curriculum.
- The time graduates expect to spend in postsecondary training or education tends to decrease as time in the labor force increases.

Conclusions

Vocational graduates in most program areas have greater long-range earnings and less unemployment than general curriculum graduates. As important as these effects are, however, the outcomes of the vocational curriculum extend far beyond them. Vocational education influences other significant outcomes, including postsecondary and occupational choices. The multiplicity of these effects supports the conclusion reached by Grasso and Shea (1979) that the vocational curriculum cannot be realistically evaluated in terms of any one outcome, such as earnings or the extent of training-related placement.

By way of illustration, occupational choice involves not one or two effects, but a wide range; normally, the outcomes of any individual choice are positive in some dimensions and neutral or negative in others. The labor market experience as a whole involves this wide range of effects that includes earnings, employment, job status, and job satisfaction. As much as possible, evaluation should take this multiplicity of effects into consideration. Equally important is the recognition of the difference in values that leads individuals to choose some of the available labor market benefits over others.

The findings of this study indicate that vocational graduates use the skills learned in their secondary training programs to a fairly high degree. The young adults here were more likely to work in jobs related to their vocational training when their high school programs included instruction in job-seeking skills and direct assistance from teachers in finding work. If a higher rate of training-related placement is a primary goal, it seems that vocational programs can successfully work toward this outcome.

A final area of importance is gender equity; this study supports the well-known finding that men have a significant earnings advantage over women. Most of the women in this study had specialized in fields in which women have traditionally worked—business/office, health, and home economics—whereas the men specialized in such areas as agriculture and trade/industry. Some women, however, had not made traditional choices, which resulted in a difference in earnings; for example, women in trade/industry earned more than those in traditional programs. This suggests that if secondary vocational education increasingly encourages young women to choose specialties without regard for traditional roles, one source of the earnings inequity can be significantly changed.

Overall, the long-term effects of vocational education are relatively positive—particularly in view of earlier claims that this curriculum confers only short-term benefits. Vocational graduates earn more over the first fifteen years of their careers than they would have if they had graduated from a general curriculum. To this earnings advantage can be added the considerable benefit of less unemployment—an important outcome in an economy deeply concerned about employment. These findings display the vitality of the vocational curriculum. The long-term value of the increased earnings alone seems to exceed even the highest estimates of the marginal costs of providing this curriculum to young people.

CHAPTER 1

BACKGROUND

The Short-Term and Long-Term Effects of Vocational Education

At best, measuring the effects of participation in a curriculum is difficult. Even if the necessary data are available, a study must take into account the numerous factors and influences that compete with the educational program in affecting outcomes. The difficulty increases when the effects to be studied are long term. To the usual problems of specifying effects clearly and designing a methodology that will display them is added the scarcity of data. Longitudinal surveys, which follow students over time, do exist (e.g., the 1966-78 National Longitudinal Surveys of Labor Market Experience for Young Men and Young Women, and the National Longitudinal Study of the High School Class of 1972). These surveys are costly, however, and relatively few in number. Furthermore, the long-term data are many years in developing. As a result, studies of the long-range influence of vocational education are rare.

. . studies of the long-term influence of vocational education are rare.

The emphasis on the evaluation of vocational programs has led to considerable analysis of the effects.* Because of the difficulties of studying long-term effects, most studies have focused on those that take place in the first months or years after graduation. Although the findings of these studies are valuable, they do not necessarily describe the long-term experiences of vocational students and probably cannot be extended beyond the time period surveyed.

Increased understanding of the short-term effects of vocational education—in particular those that surround the labor market experience—has led to an increased need for information on the long-term outcomes. There is a growing body of evidence that vocational programs exert an immediate positive influence in this regard, that these programs aid the transition from high school to work and confer certain labor market advantages in the first few years after high school (Mertens et al. 1980). Various findings suggest that these advantages may include higher initial earnings, greater job satisfaction, and readier employment.

These analyses have not, however, resolved the issue of the labor market outcomes of vocational education. Instead, positive findings of the short-term effects of this curriculum have led critics to speculate on its long-term effects. Some have contended that, whereas the vocational curriculum may indeed lead to positive short-term outcomes, it limits long-term opportunities and often "tracks" young people into low-status, low-paying jobs

*See, for example, Campbell, et al. 1981; Campbell, Orth, and Seitz 1981; Grasso and Shea 1979; Gustman and Steinmeier 1981; Mertens, et al. 1980; Meyer 1981a, 1981b; National Institute of Education 1981; Nolfi, Fuller, Corazzini, Epstein, Freeman, Manski, Nelson, and Wise 1978; Rumberger and Daymont 1982.

that offer no possibilities for advancement. A comprehensive review of the available literature on the effects of vocational education (Mertens et al. 1980) also found studies suggesting that vocational graduates earn more than their nonvocational peers immediately after high school, but that the earnings advantage disappears after a few years.

There is a growing body of evidence that vocational programs . . . confer certain labor market advantages in the first few years after high school.

Those studies that have considered longer periods of time have arrived at different conclusions. In one of the few analyses of long-term earnings, Fredland and Little (1981) concluded that midcareer white men who had received vocational training either in the military or in civilian life, and who used it on their jobs, earned more than comparable workers with no vocational training. Findings such as these strongly suggest that the long-term effects of vocational education might differ in some important aspects from short-term effects. This being the case, the results of studies of short-term outcomes cannot reasonably be expected to establish the validity of claims regarding long-term outcomes.

The need for additional analysis of this issue led the National Center for Research in Vocational Education to undertake, with sponsorship by the Office of Vocational and Adult Education, U.S. Department of Education, a study of the long-term effects of vocational programs. The results of this study were first presented in *Vocational Education and the Younger Adult Worker* (Mertens and Gardner 1981) which contains a detailed analysis of the data. A summary of the study has also appeared in the *Journal of Vocational Education Research* (Mertens and Gardner 1983).

The purpose of this report is to make the findings of that research available to a broader readership. The analysis is based on a national cross-sectional survey, described below, and is designed to consider the long-range impact of vocational education on graduates who were in the labor force at the time of the survey.

Young Adult Workers: The Study and the Database

In early stages of investigation, the study team found that the analysis could not be carried out with existing data. Statistical resources for research in this field had been reviewed by Darcy, Orth, and Whitmore (1981), who identified twenty-six databases of potential relevance to studies of vocational education. Of these databases, several contained information on the work histories and education of those surveyed, but even those databases with the largest quantity of relevant information did not contain the data needed for a careful study of long-term effects.

For instance, long-range labor market histories were available in the 1966-78 National Longitudinal Surveys of Labor Market Experience for Young Men and Young Women, but those surveys did not collect data on high school vocational program areas. Since effects may differ widely with program areas, these data seemed necessary to the study. A broad range of information was contained in the National Longitudinal Surveys of Labor Market Experience New Youth Cohort (Borus, Crowley, and Rumberger 1980), but this survey focused on youth between fourteen and twenty-one years of age. The cohort was still too young for the data to reflect long-term experience. A third relevant database, the National Longitudinal Study of the High School Class of 1972 (Taylor, Stafford, and Place 1981), similarly contained useful material, but extended at this point only seven years beyond the respondents' high school graduation.

. . . little information on long-term earnings has been available, and the earnings of vocational graduates are the subject of considerable debate.

For these reasons, the National Center for Research in Vocational Education commissioned a new survey, designed to gather information on the long-range impact of vocational education. To develop a data set at a reasonable cost, the National Center contracted with the Gallup Organization to conduct a survey through telephone interviews in the first three months of 1981. (The methodology of the survey is described in the appendix.) This national cross-sectional survey collected information on 1,539 young adults between the ages of twenty and thirty-four who were in the labor force at the time they were surveyed. The survey was constructed so that one-half the sample had taken vocational education in high school and one-half had not.

This report gives the findings of the study regarding four kinds of long-term outcomes of vocational education: earnings, employment, education, and aspirations. The primary emphasis is on the long-term relationships between vocational education and the labor market experience since little information on long-term earnings has been available, and the earnings of vocational graduates are the subject of considerable debate. The discussion of postsecondary education deals with the specific kinds of education and training undertaken after graduation. Finally, the findings on aspirations deal with both the educational and the occupational goals of the young adult workers surveyed. For each of these areas, long-term effects for minorities, women, and the disadvantaged are separately analyzed, and differences between the outcomes for these groups and those of the sample as a whole are discussed.

Problems in the Study of Long-Term Effects

The study of vocational education outcomes, particularly long-term outcomes, involves several problems. For the most part, the difficulties derive from the nature of the data needed. Ideally, the data would have been gathered over the period of time under study, in this case, fifteen years. The information would be verified by documentation where appropriate, and the sample would be large enough to represent fully all the subgroups treated in the study. Such a database did not exist when this study began, nor could it be created retroactively. The difficulties, then, surrounded the question of arriving at a representative sample and gathering accurate data within the limits of funding.

Additionally, any study of effects must be constructed to deal with questions specific to this kind of research. Those methodological issues that are very technical in nature are discussed in the appendix. The following brief discussion considers several problems encountered in designing this study of long-term effects.

The Accuracy of Retrospective Data

Facts recalled years later are likely to be remembered inaccurately. Documentary evidence in the form of records kept by schools or employers is much more reliable. However, no survey had gathered the information needed when it was fresh, and the probable expense of documenting this database to increase accuracy was prohibitive. This study is therefore based on retrospective data. In view of the inherent inaccuracies in this kind of information, methods of statistical analysis were chosen that temper the unreliability of retrospective data.

Self-report of Curriculum

Potential errors of memory assume more weight when they concern curriculum, since

graduates of vocational programs must be distinguished from graduates of academic and general programs. However, when survey respondents give this information, there is likely to be a degree of error; for example, graduates often misunderstand or mis-state the curricula in which they participated, a problem that has been discussed in several previous studies (Grasso and Shea 1979; Meyer 1981a). A detailed study of this issue by colleagues at the National Center showed substantial differences between what respondents reported and what their transcripts showed (Campbell, Orth, and Seitz 1981).

Verification of reported curricula is clearly desirable but seldom possible, since transcript collection is very time-consuming and expensive. This study, like most, relies upon the data given by respondents about their curricula and specialties. In this respect, the database is not ideal, but it is comparable to other national databases.

The Meaning of Curriculum Choice

The ideal sample for the study of vocational education would be one in which students were randomly assigned to their high school curricula, so that no prior influences would affect the outcomes. This, of course, is neither possible nor desirable from a practical point of view. Studies of this kind must therefore attempt to take into account some of the factors that seem to influence both curriculum choice and later outcomes. This study examines a range of significant factors. Among the variables included in the analysis are race, gender, and the socioeconomic status (SES) of the graduate's family.

One factor not included is "ability," an unmeasured, and perhaps unmeasurable, factor. Although many studies of ability have been undertaken, there is as yet no equation for this purpose that does not have a specification error (Chamberlain and Griliches 1975; Griliches 1977; Judge, Griffiths, Hill, and Lee 1980; Willis and Rosen 1979). What effect the omission of this factor has on the overall findings is impossible to determine. This is, however, a problem common to every attempt to estimate the effects of secondary vocational education.

Grouping of Vocational Programs

Since there is great variety in vocational programs, it is desirable for the sake of simplicity to group programs into areas, if that can be done with no distortion of results. There are numerous ways to do this. A preliminary analysis of the survey data suggested the use of four categories: (1) business/office/commercial (identified by the heading business/office in the tables and text), (2) distributive education, (3) trade and industry (trade/industry), and (4) "other" which encompassed agriculture, health, and home economics. (The use of this composite category was suggested by the fact that effects were not significantly different for graduates in each of these specialties.)

The survey contains data on only a few graduates who had specialized in distributive education, too small a sample to give reliable estimates on effects for that group. However, initial analysis suggested that effects for these respondents might be very different from those of other graduates. This category was therefore kept separate so that results in the other program areas would not be biased.

Controlling for Levels of Education

It is common knowledge that educational attainment is closely related to such outcomes as employment, earnings, and occupational prestige. If a study does not take the influence of this factor into account, the findings will not represent the outcomes of a curriculum accurately. This study uses two methods of controlling for the influence of the educational level.

The first method, which follows the examples of several other researchers,* restricts the analysis to respondents who graduated from high school and had no further education. This group of people who have the same level of education is referred to in the text as the "restricted subsample."

Additionally, the analysis uses equations that reflect postsecondary education and training. Estimates are made of the effects of completion of eight kinds of educational programs at several levels; the varying effects of these programs are discussed fully in chapter 3. The primary advantage of this statistical method of controlling for educational attainment is that it can be used with the full sample, thus taking into account a greater body of information. The use of these two methods should control for the effects of educational attainment so that the findings reflect the influence of secondary vocational programs.

Organization of This Report

This report reflects the fact that the long-term effects of vocational education take place in a context of other influences. Some of these—such as the effects on the individual of the local labor market—could not be included in this analysis, but undoubtedly affect the outcomes of vocational education. Chapter 2 describes the broad context within which long-term effects are formed. The intent is not only to facilitate understanding of the findings given here, but also to point out probable influences on these long-term outcomes that could not be measured by this study. The chapter concludes with an explanation of long-term earnings profiles, or life-cycle earnings progressions, by means of which the earnings outcomes of vocational education are described.

. . . the long-term effects of vocational education take place in a context of other influences.

The results of this analysis of the long-term effects of vocational education are presented in chapter 3. The findings are grouped into four categories: earnings, employment, education, and aspirations. For those who are interested in a detailed description of the sample and the study, the data collection and methods of analysis are presented more fully in the appendix.

*See Grasso and Shea (1979), Meyer (1981b), and Gustman and Steinmeier (1981).

CHAPTER 2

CONTEXT

The vocational curriculum is one of many forces that influence the participant's experience. Individual and contextual attributes, labor market dynamics, and personal choice are some of the major influences that modify the long-range effects of vocational education. The action of these other influences can alter the outcomes of vocational education, sometimes significantly. Any consideration of the effects of the vocational curriculum should therefore take into account the other factors that also affect the long-term experience of former vocational students.

The action of . . . other influences can alter the outcomes of vocational education, sometimes significantly.

Given this complex interplay of factors, measuring the long-term effects of vocational education is difficult. Nevertheless, such effects do exist and can be studied through comparison of former vocational students with their nonvocational counterparts. This chapter surveys the broad context within which the labor market effects of vocational education take place, with emphasis on the actions of the labor market, and the factors that influence individual decisions. Since this study considers long-term earnings in terms of life-cycle earnings progression, the chapter also includes an explanation of this method of analyzing earnings.

The Labor Market

The labor market experience is influenced by the concerns and skills of prospective employees, the needs of employers, and the ability of the two to come into contact with one another. Economic theories of the labor market explain these concerns in various ways. In its consideration of labor market outcomes, this study uses an eclectic framework that takes into account four major economic theories. The marginal productivity theory of *labor demand*, a utility theory of *labor supply*, the search theory of *labor market dynamics*, and the theory of *institutional constraints* are briefly described in this chapter. Each of these puts forth concepts that are useful in evaluating the labor market effects of vocational education.

Labor Demand

Figure 1 shows those factors that, according to theories of labor demand, affect labor market outcomes. The marginal productivity theory of labor demand holds that firms decide how much of each kind of labor to employ by comparing their net real marginal productivities.

Marginal productivity is affected in numerous ways by education. Vocational programs are designed to teach a number of skills that enhance productivity, including job-specific skills, basic communication skills, and safe work habits. Vocational education may further influence productivity by increasing the student's capacity to learn a job, a skill that should reduce the cost of on-the-job training.

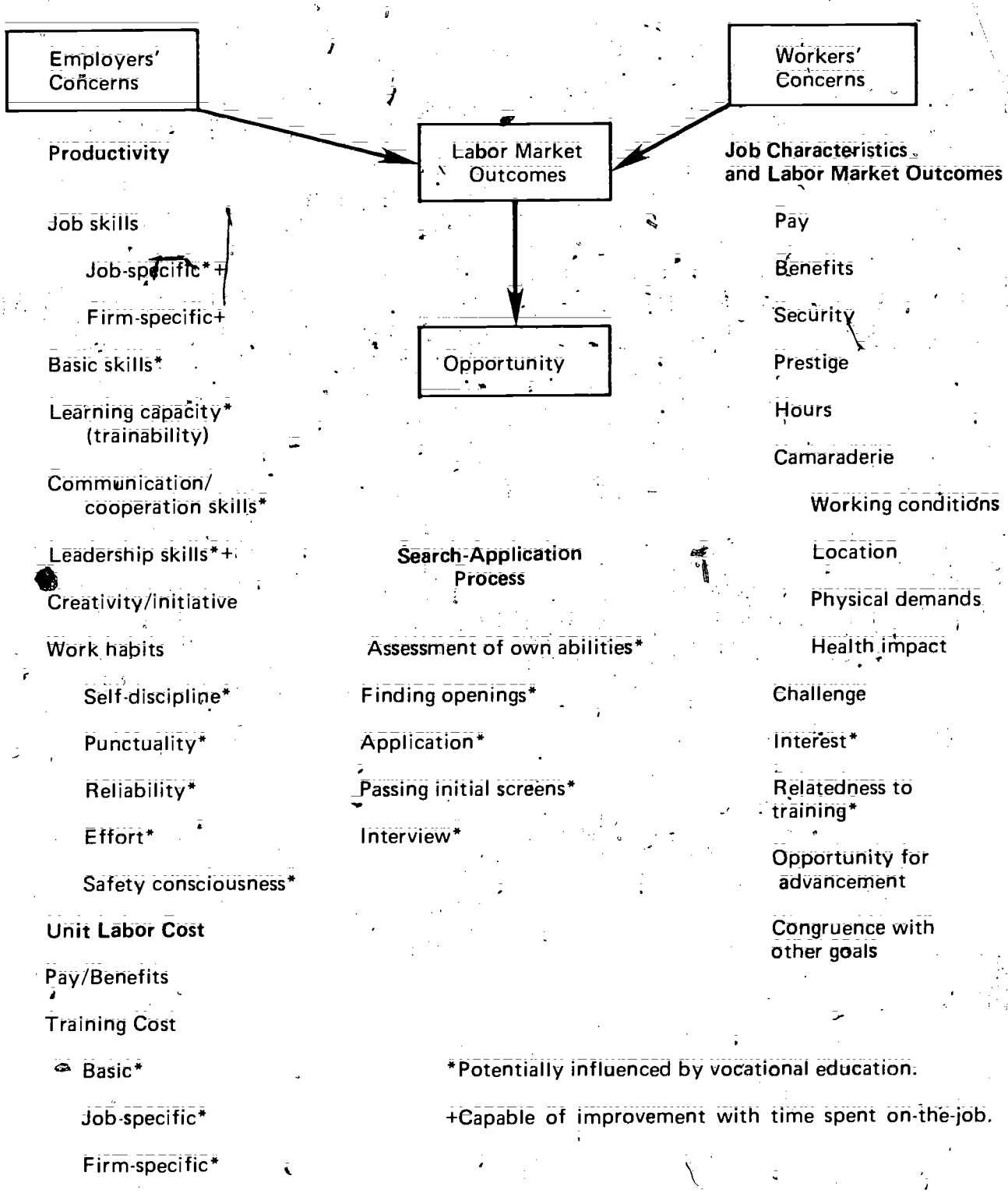

Figure 1. Direct influences on labor market outcomes

SOURCE: Mertens and Gardner 1981.

If the vocational curriculum does impart skills such as these more effectively than the general curriculum, then graduates of vocational programs should have higher net productivity on the job, making them more desirable candidates for employment and their employment prospects more plentiful. The vocational curriculum should serve as a signal to employers, and make vocational graduates more in demand. This demand should continue as long as employers' expectations are met.

The signalling function is as important to employers as it is to job seekers. One of the major problems most employers face is determining the job applicant's proficiency. Assessing productivity can be costly in terms of time, and hiring on the basis of apparent potential is always accompanied by some degree of uncertainty. This is why the signalling function of an educational program is valuable to employers; it enables employers to hire more readily and with more confidence, and to set wages appropriately, paying new employees more when they believe them to be better risks. If that signalling function is operating for vocational education graduates, it is obviously as valuable to them as it is to employers.

The evaluation of productivity continues as employees acquire tenure with the firm. Theories of labor demand point out that earnings can rise with tenure for one of two reasons. First, the employee's work itself can now be assessed; ideally, productivity is growing as the employee learns firm-specific and job-specific skills. Second, potential becomes more visible; the employer may raise wages because it seems likely that the worker will be productive at a future time. But whether the employer is rewarding present or anticipated productivity, the fundamental concern is still productivity.

Labor Supply

Labor market decisions are not made entirely by employers. Prospective employees also make decisions, directing their own job searches and deciding whether or not to seek or accept specific jobs. Undoubtedly, the choices job seekers make influence their own labor market outcomes to a significant degree. These choices are guided by individual criteria, which for most involve such job characteristics as pay, hours, and opportunities for advancement. (A more comprehensive list is given in figure 1).

Labor supply can be affected by vocational education in several ways. The vocational program may affect supply by influencing graduates to prefer jobs with particular characteristics. It can be biased toward teaching certain skills that are appropriate to particular occupations; if so, graduates are more likely to seek work in those occupations. It can encourage a student's existing interests in particular kinds of work, or introduce possibilities and influence new interests. In these and other ways, the curriculum itself can affect supply.

Labor market decisions are not made entirely by employers. Prospective employees also make decisions.

Vocational education might also affect the supply of labor through the signalling function discussed previously. If employers do select vocational graduates in preference to graduates of general curricula, more students might enter vocational programs as a result. This would soon increase the supply of vocationally educated labor. Numerous effects might result from such an increase; foremost is the reduction of any favorable earnings differential between vocational graduates and generally educated labor. With an oversupply of job candidates, the typical job search would probably lengthen for vocational graduates, resulting in a rise in their unemployment rates. This possibility has been described by Gustman

and Steinmeier (1980), who also note that such a phenomenon depends on the availability of facilities and instructors and the ease of entry into vocational programs.

Labor Market Dynamics

The vocational curriculum can also affect the labor market indirectly by influencing the individual in meaningful ways, for instance, in conducting a job search. Vocational programs can give students help in assessing their abilities, impart information on how to compose resumes, teach interviewing techniques, and so on. These and other techniques are taught in vocational programs because of the evidence that they do make the job search more efficient, and thus enable the graduate to find a job more quickly and at better pay. Insofar as this job search training is effective, vocational education is affecting two important labor market outcomes, earnings and employment. If enough students are trained in job search techniques and use these techniques successfully, then vocational education might significantly influence the labor market.

Labor market dynamics are not confined to those that surround the job search, but operate throughout the worker's career. One outcome influenced by these dynamics is advancement, which normally occurs as the employee acquires or improves skills, and in general demonstrates competence on the job. If this competence is not rewarded, most employees look for a firm that will compensate them adequately. This compensation does not always take the form of higher earnings; better working hours, more prestige, safer working conditions, and more desirable duties are among the nonmonetary benefits employees may seek. Whatever the compensation, improved earnings capacity is usually reflected in pay or in more satisfactory working conditions.

. . . compensation does not always take the form of higher earnings . . .

Institutional Constraints

The theories just discussed rest on the assumption that employees are paid according to their individual productivity, as reflected in a competitive market. But institutional constraints also affect this process. These constraints can include internal labor markets in firms that offer employment opportunities first to existing staff, or limited ports of entry, found in firms which demand that those hired have certification of a particular type. The competition for wages can also be strictly limited by highly bureaucratic hiring and wage-setting processes. In addition, government regulations, such as minimum wage laws, may inhibit the payment of wages that correspond to productivity.*

In general, these limits are less restrictive than they might seem at first. Employers who are unable to adjust wages according to productivity often find ways to adjust other aspects of the employment situation to compensate valued workers. Although more productive workers do not necessarily have higher earnings, their productivity generally results in positive labor market outcomes of some kind.

One possible outcome, when wages cannot be raised because of institutional constraints, is greater employment. An employer who pays all employees minimum wage will attempt to distinguish among applicants and hire those who promise to be most productive. If the anticipated productivity of vocational graduates is high, they will be hired more

*For further discussion of these constraints, see Doeringer and Piore (1971), Okun (1981), Thurow (1975), and Williamson, Wachter, and Harris (1975).

quickly than others and will spend less time unemployed. If the employer pays only minimum wage, their earnings can be no higher, but their superior productivity on the job may be reflected in other outcomes, such as more frequent promotions.

In these and other ways, institutional constraints affect labor market outcomes. This is an important consideration in the evaluation of the outcomes of vocational education. Although earnings are a significant outcome that must be examined, institutional constraints can shift the reward for increased productivity from higher earnings to other kinds of compensation. These other outcomes should be fairly represented in any examination of the effects of vocational education.

Influences on the Labor Force Decision

Most surveys fail to include all of the elements that influence labor market outcomes. The survey done for this study, typical in this regard, does not measure several potentially meaningful factors, including job skills and knowledge of interview techniques. In order to examine these theoretical outcomes, it is therefore necessary to translate them into counterparts for which data are available. Figure 2 and exhibit 1 attempt to do this. Figure 2 outlines a framework that relates broad categories of influence to labor market outcomes. Exhibit 1 lists specific elements within each category.

Choices

The center of the diagram in figure 2 is the decision point individuals face as they leave high school. The major choices, indicated by arrows from the decision point, are entry into the labor force, or staying out of the labor force in order to pursue postsecondary education or concentrate on family responsibilities. These possibilities remain open; new decisions may be made later and steps retraced. The arrows to the decision point indicate influences on the decision. Overall, the diagram is intended to illustrate the broad context within which individuals make decisions that ultimately influence labor market outcomes.

The options available to individuals are not mutually exclusive. People may decide to pursue paths singly or in combinations. If they pursue more than one path at a time—working and going to school, for example—they must decide how much emphasis to give each one. Moreover, there are numerous options within each category. Postsecondary education is a good example of this variety of choice. Exhibit 1 lists several traditional kinds of postsecondary education, such as business, trade, or technical programs in private schools, public community colleges, or technical institutes. This study also included a range of other options that might be considered postsecondary education or training:

- Government-sponsored training in programs such as JTPA and WIN
- Military training in specialties related to civilian jobs
- Training experiences associated with particular jobs, such as apprenticeship or employer-sponsored (not OJT) training

Influences on Choices

No one knows the extent to which individual choice is affected by external factors, but it seems highly probable that the decision-making process is influenced in numerous ways by both individual and contextual attributes. These factors influence the choice of high school curriculum, a choice that affects labor market outcomes in important ways.

Individual and contextual attributes. Ability, age, race, and gender are among the measurable individual attributes that influence decisions and hence labor market outcomes. The context within which the individual operates includes other influential factors such as community SES and region of the country. These attributes influence the post-high school decision, as well as labor market decisions later in life.

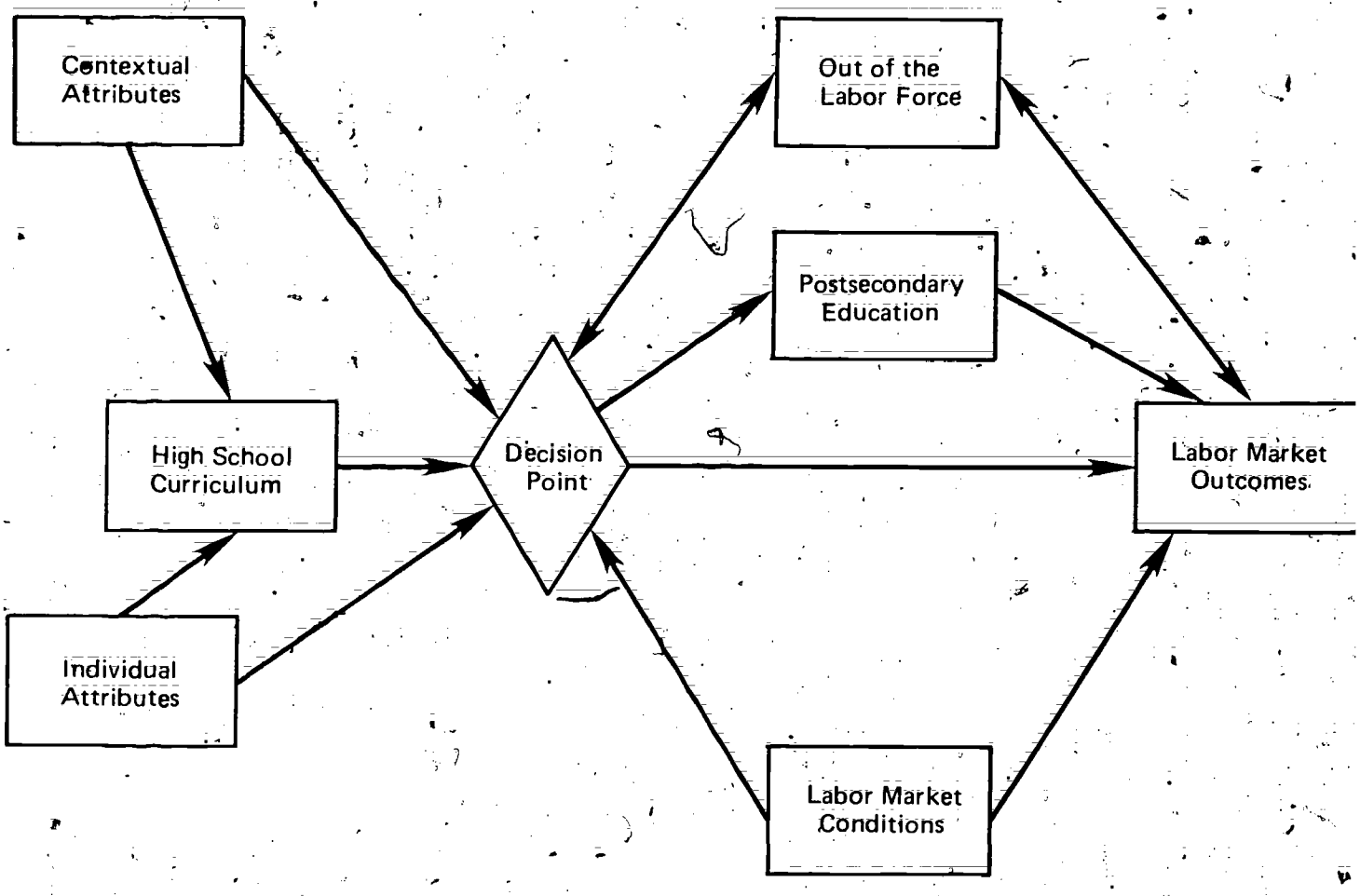

Figure 2. Factors influencing labor market outcomes

EXHIBIT 1

FACTORS AFFECTING LABOR MARKET OUTCOMES

Contextual Attributes

- Region
- Environment
- Community SES

Individual Attributes

- Ability
- Motivation
- Gender
- Race
- Family SES
- Physical limitations
- Marital status
- Age

High School Experience

- Basic skills
- Curriculum satisfaction (would repeat curriculum)
- Vocational program area
- Jobs held
- Job skills
- Job-seeking skills
- Employability skills
- Placement assistance
- Intensity of study
- Certificate

Postsecondary Education

- Type
  - Business, trade, technical program: private school
  - Business, trade, technical program: public community college or technical institute
  - Four-year college
  - Graduate school
  - Government training program
  - Military training
  - Apprenticeship
  - Employer-sponsored training
- Participation
- Length of participation
- Completion
- Certification
- Use on job

EXHIBIT 1 — Continued

Labor Market Conditions

- Industry mix
- Labor demand
- Region
- Urban/rural location

Participation in the Labor Force

- **Employment History**
  - Kind of work experience
  - Number of jobs
  - Months on longest job
  - Recent unemployment
- **Current Employment**
  - Industry
  - Occupation
  - Unionization
  - Pay
  - Hours worked per week
  - Weeks worked per year
  - Relatedness to training
  - Tenure
  - Job status
  - Job satisfaction

Time Out of the Labor Force

- Family
- Military
- Postsecondary education

High school curriculum. The choice of high school curriculum itself is probably influenced by individual and contextual attributes; this decision in turn affects labor market outcomes. The influences of curriculum are too subtle to be described with reference only to whether the curriculum is academic, general, or vocational. Additionally, not all students report their high school curricula accurately. Recognizing this, the survey gathered information on specific aspects of the high school experience. These included use of acquired skills on the job, the availability of placement assistance in the respondent's high school, the intensity with which vocational skills were studied, and the respondent's satisfaction, in retrospect, with the choice of curriculum. These data enable a more exact study of the relationship of curriculum to labor market outcomes. Future studies on the effects of vocational education should use a more precise system of classifying participants, such as that offered by Campbell and others in *Patterns of Participation in Secondary Vocational Education* (1981).

Aspects of Employment

Labor market decisions are also influenced by the local labor market. Such factors as industry mix, employment rates, region, and the extent of urbanization in the individual's area all limit choices and affect decisions. They also influence outcomes; an obvious example is the effect of the local labor market on unemployment.

Once people enter the labor market, the jobs they hold affect their labor market outcomes, often to a significant degree. A unionized job in manufacturing is more likely to be an operative than a professional position, a fact that affects the relative prestige of the job. Unionization is also likely to affect earnings, possibly to a greater extent than does high school curriculum. The nature of the industry in which an individual is employed also has a distinct effect on earnings.

Other aspects of employment significantly influence earnings. Tenure on a job is closely related to pay, and often to prestige as well. Tenure, in turn, reflects the length of time the employee has been in the labor market. Labor market outcomes, job characteristics, and individual work history are interdependent forces. This broad interrelatedness has important implications for estimates of the effects of vocational education—or any curriculum—on labor market outcomes.

Life-Cycle Earnings Progressions

Labor market outcomes are not static. As high school training becomes progressively less relevant to productivity on the job and experience becomes more relevant, earnings change. Accordingly, differences between the earnings of graduates from differing curricula may also change.

Gustman and Steinmeier (1981) discuss the path this progression might take if vocational education directly replaces early on-the-job training. Former vocational students would have an initial earnings advantage over general curriculum students. However, there are usually limits to the proficiency a worker can attain in a job, and gradually other workers should become as productive as those who had vocational training. If this is the case, the early earnings differential should narrow until finally it disappears. Figure 3(a) depicts this progression.

Labor market outcomes are not static. As . . . experience becomes more relevant, earnings change.

A different earnings progression will occur if the primary advantage that vocational students take into the workplace is not the equivalent of early on-the-job training, but the

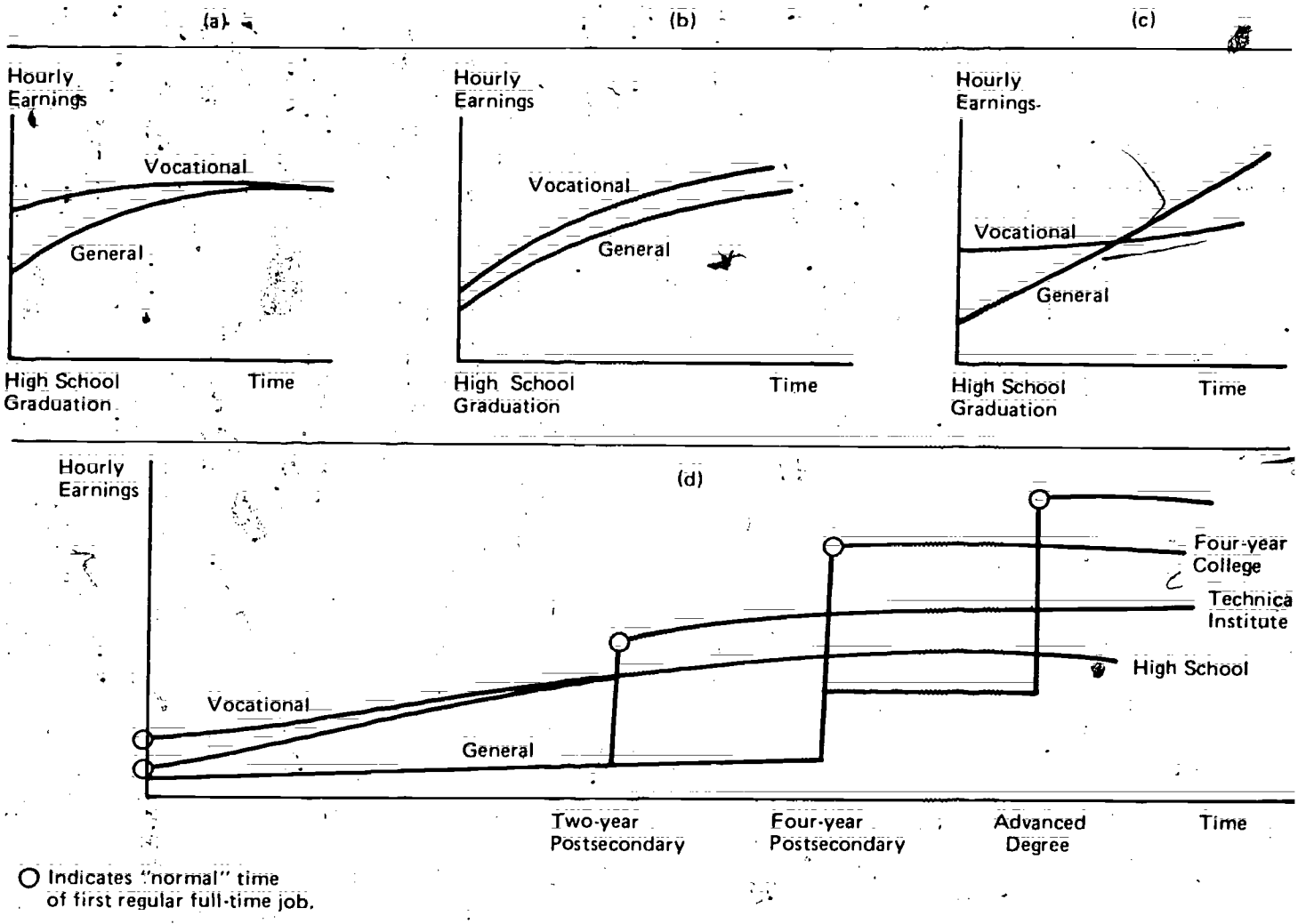

Figure 3. Life-cycle earnings progressions

SOURCE: Mertens and Gardner (1981, p. 27).

ability to learn the job more quickly. In this case, the initial earnings advantage could be expected to be small, but to remain constant or grow with time: this possibility is depicted in figure 3(b). (It might be, however, that there is a limited amount to be learned in a given job; in that case, the ability to learn would become progressively less important, and any advantage in productivity and earnings would eventually disappear.)

Meyer (1981b) suggests another earnings progression, based on the observation that vocational students systematically find employment in jobs that are different in type and therefore in their earnings profiles from the jobs general students find. Vocational students, he suggests, tend to take jobs with high initial earnings that increase at a relatively slow rate over time. General students earn less initially, but the earnings profiles of their jobs are steeper. This progression, shown in figure 3(c), is one in which former vocational students begin with an advantage and eventually end up with a disadvantage in earnings.

Comparisons of the earnings progressions of vocational and nonvocational students are valid to the degree that other variables are controlled, so that the groups being compared are as nearly equal as possible in other respects. An important variable to consider in analyzing earnings cycles is the level of educational attainment. Figure 3(d) emphasizes the fact that individuals have varying levels of education when they take their first full-time jobs and that postsecondary attainment does affect initial earnings. One approach to this problem is to compare survey respondents with equal amounts of education, as Grasso and Shea (1979), among others, have done. This study used that method, creating a "restricted" subsample of graduates with no further schooling.

This method alone does not, however, provide the best test of the effects of vocational education on labor market outcomes. Curriculum choice itself is related to postsecondary attainment, which in turn affects labor market outcomes. As figure 3(d) shows, graduates of vocational programs are more likely than graduates of a general curriculum to go on to postsecondary schooling, and this is significant in terms of lifetime earnings. This being the case, it is necessary to control for differing levels of attainment among graduates of different curricula in order to study the effects of the curricula themselves.

The study therefore added a second method of controlling for the effects of educational attainment. Completion of postsecondary programs was noted for each respondent in equations that reflected the additive impact of this education in terms of labor market outcomes. Whereas the restricted subsample was only a portion of the group surveyed, these equations could be used on the entire sample. As a result of this combination of methods, the life-cycle earnings progressions discussed in the next chapter take into account the influence of postsecondry schooling on earnings.

CHAPTER 3

FINDINGS

Since this study gathered information on young adults who were in the labor force at the time of the survey, the conclusions apply only to those individuals who are either working or actively looking for work. The analysis focuses on four kinds of outcomes: earnings, employment, education, and aspirations. These outcomes seem to encompass the most significant aspects of vocational graduates' long-term experiences. The results of the study and the implications of these results are presented next.

Earnings

Earnings as a standard for the evaluation of vocational education have probably been examined more closely in the past than any other effect of the curriculum. Until this study, however, nearly all analyses have focused on short-term earnings, with some critics contending that short-term benefits disappear after a few years. The results of this analysis of earnings for vocational, general, and academic curriculum graduates refute that allegation. Although there are exceptions, vocational graduates overall enjoy a long-term earnings advantage over graduates of a general curriculum.

Long-Term Earnings Differentials

The long-term effects of vocational education on earnings were studied through estimations of earnings differentials. These differentials represent the difference between the earnings of graduates of one curriculum and the earnings of graduates of another. Long-term earnings differentials are estimated by beginning with the difference in earnings between the two groups at the point of entry into the labor force and calculating changes in that earnings differential over time.

. . . vocational graduates overall enjoy a long-term earnings advantage over graduates of general curricula.

So that the samples would be as comparable as possible, they were controlled for postsecondary educational attainment and personal background. In the resulting estimates, postsecondary education and training are clearly associated with higher earnings; the extent of the effect varies with the type of educational program. The estimates for secondary curricula show some interesting profiles; however, the estimates of variations in earnings cycles between the high school curricula are not precise. These data cannot be interpreted as showing definitive differences in the effects of various high school curricula, a finding which necessarily suggests the possibility that the differences between the high school curricula do not lead to differences in weekly earnings.

The familiar earnings profile for men, in which earnings increase with labor market experience, is corroborated by the data on

men with no postsecondary education. For male graduates of a general curriculum, earnings per week increase about $7-$12 per week with each year of experience. For graduates of an academic curriculum, the rate of increase is about 50 percent higher. For graduates of a vocational curriculum, it is lower. This means that initial differences in earnings change over time; the favorable differential increases for graduates of an academic curriculum and decreases for graduates of a vocational curriculum.

Predictably, the vocational graduate's area of specialization affects this life-cycle earnings progression. Men from vocational trade/industry programs earn more than otherwise similar men from a general curriculum. This differential narrows until, between the seventh and tenth years, it is reversed, and the earnings of graduates of trade/industry programs are less than those of general curriculum graduates. A similar pattern appears for men in the composite vocational group, which encompasses the fields of agriculture, home economics, and health. Working in a nontraditional field affects the earnings progression for men rather drastically. Because wages are relatively low in business/office occupations, those with specialties in this field start out with an earnings disadvantage that increases slightly as more labor market experience is acquired.

For women, earnings rise with time much more slowly than for men. This should be viewed in light of the fact that the survey questionnaire did not distinguish between time spent out of the labor force for education or training and time spent out of the labor force for other reasons. More men than women pursue further training during periods of time when they are out of the labor force. Women are also more likely to be out of the labor force in order to work in the home. When those women return to the labor force, their earnings capacity is seldom enhanced as it might have been if the intervening time had been spent in school or in employment outside the home. For this reason, their earnings rise less rapidly than those of men.

Women from both vocational and academic curricula start out at an earnings disadvantage in comparison to women who graduate from a general curriculum, with one exception: women who have exactly twelve years of education and who are graduates of business/office programs start out with an earnings advantage of about $15 a week. This advantage narrows slightly, however, with increased experience. For other women, the earnings progression is different; the initial disadvantage usually reverses direction after a little experience is acquired.

As discussed, the measurements of differences among curriculum groups are not precise enough for the differences to be statistically significant at standard levels; they are, however, significant in practical terms. Over time, even a modest earnings differential can amount to a meaningful difference in income. By way of illustration, this study calculated the present discounted values of these estimated differences in earnings, using earnings profiles that begin at graduation from high school and extend over fifteen years, about the length of time that is represented in the sample. The resulting figures represent respondents who did not complete training or educational programs after high school graduation.

For male graduates of a vocational trade/industry curriculum, the present value of earnings over a fifteen-year period is estimated to be at least $3,300 more than that of general curriculum graduates. For those in the composite vocational group, the long-term advantage is small, only $200. Male graduates with business/office specialties begin with an earnings disadvantage and show substantially lower long-term earnings as well; according to these estimates, they earn about $3,700 less over a fifteen-year period than general curriculum graduates.

Although the predicted earnings of male academic graduates are a great deal higher than those of male graduates of a general curriculum, the earnings of female academic graduates are lower than those of their general curriculum counterparts. In contrast, for

women with high school diplomas only, those in all vocational specialties are estimated to have an earnings advantage over those in academic and general curricula of about $7,000 over a period of fifteen years.

Over time, even a modest earnings differential can amount to a meaningful difference in income.

These estimates are relevant to the ongoing debate over the costs of providing vocational courses in high school, which are estimated to be higher than the costs of the other curricula. For graduates of vocational programs, with the sole exception of men in the business/office field, the costs of vocational programs appear to be justified. The earnings advantages, as estimated here, would more than offset the costs of providing vocational courses, even if improbably high estimates are used.

The Effect of Postsecondary Education on Earnings

The effects of four types of postsecondary vocational education and training programs were examined here:

- Public community colleges or technical institutes
- Private two-year colleges or business or technical schools
- Apprenticeship programs
- Employer-sponsored formal training programs

Completion of any of these programs seems to lead to higher future earnings, with two exceptions: public community college programs for men and apprenticeship programs for women. The reasons for these two effects are as yet not clear. Otherwise, those who participate in these kinds of postsecondary programs earn substantially more over time than do high school general curriculum graduates.

The difference in earnings is often sizable, ranging in many cases from $500 to $3,000 per year. The greatest gains are shown among men who completed apprenticeship or proprietary school programs and women who took part in employer-sponsored training. This finding is of great interest, but should not at this point be viewed as definitive. Extremely high percentages of women said they had received employer-sponsored training, and unexpectedly high percentages of men said they had completed apprenticeship programs. It may be that respondents' interpretations ranged beyond the commonly accepted definitions of these terms. Further research would clarify this issue.

The data also suggest that, for both men and women, completion of postsecondary proprietary school programs leads to higher weekly earnings than completion of programs at public community colleges or technical institutes. This may be due to the differences between these types of institutions. In general, proprietary schools differ from community colleges and technical institutes in their ability to focus on a very narrow range of specialties; often these are in fields in which earnings are relatively high. Some proprietary schools limit enrollment to students with specific qualifications and may develop extensive networks for job placement in the school's specialty. This finding should be considered as suggestive rather than definitive; because the study was not designed to focus on the effects of postsecondary programs, further research in this important area would be useful.

Employment

Traditionally, the federal legislature has emphasized training-related placement as a measure of the effectiveness of vocational programs. Employment itself, however, is

undoubtedly of equal or greater importance, particularly for minorities. The findings in this category suggest that whether or not vocational graduates work in their fields of specialty, they are likely to experience less unemployment than their peers who graduated from a general curriculum.

Rates of Employment/Unemployment

This study measured unemployment in terms of the number of weeks respondents had been unemployed during the two years before the interview. This time period was chosen for the sake of maximum accuracy. It is long enough to reduce random variations that might be more pronounced in a one-year period, yet recent enough to be recalled with fair accuracy.

The results suggest that frequent employment is a positive effect of vocational education. For both men and women, graduation from any vocational specialty is associated with fewer weeks of unemployment than is graduation from the general curriculum. Overall this reduction in unemployment ranges between .3 and 2 weeks over a two-year period. For women, the reduction is less, with the highest figure being 1.3 weeks for graduates in the business field.

More experience in the labor force is strongly associated with fewer weeks of recent unemployment for both men and women. For those who have been in the labor force ten years, this effect ranges from 2.6 weeks less unemployment for women to 4.7 weeks less unemployment for men.

. . . whether or not vocational graduates work in their fields of specialty, they are likely to experience less unemployment than their peers who graduated from a general curriculum.

Individual attributes, particularly race and gender, are also associated with unemployment among those surveyed. Minorities—blacks, Hispanics, and Native Americans—experienced significantly more unemployment than whites. For minority women the time unemployed was even greater than for minority men. This finding again reinforces the idea that the effects of vocational education take place in a broad context of other influences.

Postsecondary education tended to reduce unemployment, although the extent of the reduction varied with the kind of program. Completion of a two-year college program was associated with less unemployment than that experienced by high school graduates. Among those who completed two-year programs, the greatest reductions were experienced by graduates of public community colleges, technical institutes, and small postsecondary proprietary schools. Completion of a four-year college or employer-sponsored training program was strongly associated with higher employment.

The imprecision of the estimates for high school curriculum variables suggests that these results should be interpreted cautiously. But until more precise estimates are available, these results are of great interest. They imply that vocational programs, both secondary and postsecondary, reduce unemployment rates for their graduates.

Occupations

Both the first regular full-time jobs and the most recent jobs held by graduates display similar patterns of occupational distribution. Among the three high school curricula, general curriculum graduates are most likely to work in laborer, service, or sales occupations. Graduates of an academic curriculum are more likely to work in professional/technical or managerial jobs. Vocational graduates are distributed in fairly predictable ways among broadly defined occupational groups.

The results verify the general observation that vocational education prepares a sizable

number of its students for work in the craft or clerical fields. Women vocational graduates are more likely than graduates of other programs to be in clerical occupations; men are more likely to work in craft or operative jobs. These data do indicate that vocational students choose traditional, role-defined specialties. However, because this study does not establish casual relationships, these findings do not support claims that vocational programs encourage role-defined choices. By the same token, these data do not support suggestions that vocational education has effectively overcome students' tendencies to choose gender-defined specialties. Among these young adult workers, traditional choice was still the norm.

Occupational choice affects numerous labor market outcomes. These include the status generally assigned to an occupation. Levels of status for occupations have been rated by Duncan (1961). According to his Status Attainment Scale, the jobs vocational graduates hold tend to be those with middle-range, rather than low-range prestige. Occupation is also related to earnings, although earnings and job status are not necessarily related. When occupations are classified by Census code, the mean earnings in the fields in which vocational graduates are concentrated tend to be in the middle range rather than the lowest range of compensation. The finding that vocational graduates choose occupations with middle-range status and earnings tends to refute the allegations of those critics who believe vocational programs prepare young people for low-status, low-paying jobs.

Use of Skills Acquired in High School

Recent legislation has used training-related placement as one significant index of the effectiveness of vocational education. The survey contains data on a closely related question, the extent to which occupational skills learned in secondary school are used on the job. Respondents who had been in vocational programs in high school were asked to rate on a four-point scale how much they used the skills they learned. The choices were "not at all," "not very much," "a fair amount," and "a great deal." This question was asked for the first regular full-time job held after high school and later for the current (or most recent) job.

The results show a surprisingly widespread use of vocational training on the job. On both their first and their present jobs, over half the men reported using the skills they learned in high school vocational programs at the top two levels on the scale. Even more of the vocationally educated women—over two-thirds—reported these high degrees of use of the skills learned in secondary school.

Comparable levels of use are reported for skills acquired in postsecondary programs. Between 60 and 75 percent of those who had postsecondary training reported that they used the skills acquired there "a fair amount" or "a great deal." A higher percentage of those who had been through apprenticeship training used the skills learned there, and 85 to 90 percent of those who had had employer-sponsored training used those skills often. These higher levels of use are, ideally, the logical outcome of programs so closely related to the employee's job.

The results show a surprisingly widespread use of vocational training on the job.

Although skill use is not a precise index of training-related placement, it does indicate the practical value of vocational education to these respondents. The extensiveness of their use of occupational skills learned in vocational education supports the belief that this curriculum is an important influence on the labor market experience of its graduates.

Related to occupational skills are those that are needed to search for and find a job. Vocational graduates report high levels of satisfaction with the extent to which their high school programs prepared them for the job search. For both male and female graduates of vocational programs, this satisfaction was significantly higher than for others.

Satisfaction with High School Program

A similar issue, and one that may be a valid consideration in the evaluation of vocational programs, is the extent to which graduates themselves believe in later years that their programs were valuable. The findings of this study indicate graduates are confident that the vocational curriculum has been useful to them. When asked whether they would repeat the same curriculum, they affirmed that they would in significantly higher proportions than general curriculum graduates. After adjustment for the effects of race, gender, rural residence, socioeconomic origins, age, and type of current job, the difference remains, with vocational graduates expressing considerably more confidence in and satisfaction with their high school programs. This satisfaction may well be related to the current usefulness of skills learned in those programs.

. . . graduates are confident that the vocational curriculum has been useful to them.

Education

Eight types of postsecondary programs were examined in this study: employer-sponsored training, apprenticeship, government-sponsored civilian training (such as WIN), military training, public community college or technical institute, private (or proprietary) trade college or technical institute, university or four-year college, and advanced degree programs. The study gathered data on participation in specific programs, time spent attending programs, and successful completion. Since the results for these three variables were similar, only program completion will be discussed here.

Successful completion was modeled separately for men and women and examined in terms of its relationship to several other variables: high school curriculum, age, race/ethnicity, socioeconomic origins, and rural residence. It should be noted that the models resulting from these data did not include variations in the cost of postsecondary education or measures of local labor market conditions; both would be included in complete behavioral models. However, because the survey covered an extended period of time, these factors do enter into the results to some degree. The respondents faced variations in cost of education and in local labor market conditions between high school graduation and the date of the survey.

Each of the eight postsecondary programs was modeled for both men and women. Of the sixteen models, the overall results were statistically significant for apprenticeship and government-sponsored training for women, public community college for men, and four-year college for both men and women. Some relationships shown in the remaining models are worth mentioning because they tend to conform to general expectations and may suggest the value of further examination. In the results given below, vocational graduates are compared to otherwise similar graduates of general curricula.

- Women who specialized in trade/industry were 18 percent more likely to complete programs at private proprietary schools.
- Men who specialized in trade/industry were 10 percent more likely to complete employer-sponsored training.
- Men from academic high school programs were 4 percent less likely to complete government-sponsored programs.

Using the same comparison, the following results were found in the five models that were statistically significant overall.

- Male graduates of trade/industry programs were 18 percent less likely to complete four-year college programs. (No other vocational specialty was significantly related to men's completion of either this or community college programs.)
- Male graduates of academic programs were 25 percent more likely to complete four-year programs, and 5 percent less likely to complete public community college programs.
- Female graduates of trade/industry programs were 9 percent more likely to complete apprenticeship programs.
- Female graduates of academic programs were 7 percent more likely to complete apprenticeship programs, and 22 percent more likely to complete four-year college programs.
- Female graduates of all vocational programs were less likely to complete four-year college programs.

Aspirations

Data on the occupational and educational aspirations of the survey respondents were gained through a series of specific questions. Initially, they were asked whether they planned to be in the same job five years from the time of the survey. Those who did not were asked what types of jobs they expected to have and whether they planned to pursue further education in order to obtain the jobs they had mentioned. Those who said they did were also asked what kind of schooling they expected to undertake and how many years they thought this further education would take.

Occupational Aspirations

About two-thirds of those surveyed said they expected to be in jobs of the same kind five years later. Overall, vocational graduates were more likely to make this statement than graduates of a general curriculum. In terms of specialty, agricultural graduates were most likely to anticipate staying in jobs of the same kind, followed by trade/industry and business graduates.

In general, men who expected to be in the same jobs five years later can be described in terms of certain characteristics. They tended to be white, had graduated from high school in business or trade/industry programs, and had four-year college degrees; they also had longer tenure on their jobs and received higher wages than those who expected to change jobs. The type of postsecondary education completed was related to this expectation; those who had completed four years of college were more likely to anticipate being in the same job five years hence, whereas those who had taken government-sponsored training were less likely.

Women who expected to remain in their jobs for five years could also be characterized in terms of certain attributes. They tended to be white and to be from lower SES backgrounds. Overall, they earned higher wages and had been on their current jobs longer than those who did not have this expectation. Although men with this expectation tended to have specialized in business and trade/industry in high school, area of specialty was not related to this expectation for women.

Those who intended to change jobs were asked about the kind of position they hoped to hold. Most often named were professional or clerical occupations. Generally, a lower percentage of vocational graduates than graduates of other curricula aspired to professional work. This varied by specialty. Thirty-six percent of business/office graduates aspired to

professional jobs, and 32 percent aspired to clerical jobs. Of those from trade/industry programs, 27 percent wanted to move into professional jobs, and 26 percent hoped to work in the crafts.

When these respondents are considered separately by gender and race, the professional area is most commonly aspired to in each category. A higher proportion of white women (46 percent) than white men (39 percent) aspired to this level. For minorities these proportions are lower, with 24 percent of the men and 33 percent of the women hoping to work in professional jobs.

Educational Aspirations

Those respondents who expected to be in different jobs in the future were asked whether they thought they needed additional schooling or training to obtain these jobs. Approximately two-thirds of those from the vocational and academic programs thought they did. A slightly smaller number of those from general programs thought the jobs to which they aspired would demand further education or training.

Type of Training. Vocational and general graduates who anticipated further training shared much the same perceptions of their educational needs. The most frequently mentioned type of education was the four-year college, followed by trade school, and then graduate school. For academic graduates, aspirations centered primarily on the four-year college or university and graduate school.

The responses of men to this question differed by race, although trade school and four-year college were the most frequent answers for all men. Twenty-one percent of the white men believed they needed to attend trade school, compared to 35 percent of the black men. Twenty-five percent of the white men aspired to four-year college, compared to 12 percent of the black men. The third most frequent response for white men was graduate school (19 percent); for black men it was marketing training (12 percent). Women, both white and minority, most often named graduate school and four-year college as the kinds of education they would need.

Length of training. Those respondents who were currently working were asked how much time they expected to spend gaining additional education or training during the next five years. For vocational graduates overall, the length of time was less than for other graduates. The exception was the men who had specialized in marketing; they aspired to significantly more additional education than their general curriculum peers, as did men from an academic curriculum. The length of time respondents expected to spend-gaining further education tended to decrease as labor force experience increased.

For women, this aspiration was not significantly affected by specialty. It did tend to increase with other variables: tenure on the current job, completion of a proprietary vocational program, and completion of an apprenticeship program. The length of time women expected to spend in future education was significantly less for those who had completed employer-sponsored training.

The length of time respondents expected to spend gaining further education tended to decrease as labor force experience increased.

In general, occupational aspirations, as expressed in the expectation of having the same kind of job in five years, are associated with several characteristics. For both men and women they include being white, having longer tenure on the job, receiving higher wages, and completing four years of college. For men, having graduated from high school in a business or trade/industry curriculum is also associated with this expectation. Women

who see themselves remaining in the same kind of job are likely to have been in the labor force longer and to have lower SES backgrounds; they may have completed a program at a four-year college or a public community college, or had employer-sponsored training.

Vocational graduates in general most often aspire to jobs in the professional or clerical areas. A lower percentage of these graduates than graduates from academic or general curricula look forward to professional or managerial jobs. Compared to other graduates, former vocational students more often feel a need for further schooling. Both vocational and general curriculum graduates most often aspire to complete four-year college programs, with the next most common educational goals being trade school and graduate school.

Summary and Conclusions

The findings of this study of the young adult worker suggest that the overall long-term effects of vocational education are relatively positive. According to this analysis, some vocationally educated high school graduates with no further education will earn more over the fifteen years after graduation than their counterparts from the general curriculum. Although this earnings advantage diminishes over time, the long-term sums involved are meaningful in practical terms. Moreover, the earnings advantage increases in proportion to the extent to which high school vocational education reduces unemployment. The long-term value of vocational programs, in terms of increased earnings, seems very likely to exceed the estimated marginal costs of providing vocational education.

The issues around the question of long-term earnings are of obvious importance to educators, policymakers, and young people making educational decisions. Ultimately, full analysis of this outcome is not possible using the data available for this study. More precise analysis depends upon more data, in particular those data that can be gathered through maintaining and using the existing national longitudinal databases.

One means of arriving at greatly improved estimates of the long-term effects of secondary vocational education is through another follow-up interview of the National Longitudinal Study of the High School Class of 1972 survey respondents. Future research into the labor market effects of educational programs can also make use of the High School and Beyond and the New Youth Cohort of the National Longitudinal Surveys of Labor Market Experience, as these surveys gather follow-up material. The National Center for Research in Vocational Education has plans to conduct these studies. But the information needed to estimate long-term effects will not be complete in those data sets for nearly a decade. For now, the estimates given here on the long-term effects of vocational education on earnings seem to be as reliable as any available.

The long-term value of vocational programs, in terms of increased earnings, seems very likely to exceed the estimated marginal costs of providing vocational education.

To these earnings advantages can be added the high use vocational graduates make of the skills learned in their high school programs. Moreover, the young adult workers studied here express satisfaction with what they gained from their high school vocational programs. Overall, the results show positive long-term outcomes of vocational education in several areas. These findings deserve careful consideration in future evaluations of this curriculum.

APPENDIX

DATA COLLECTION AND APPROACHES TO ANALYSIS

This appendix describes the collection of data for the survey commissioned for this study and the general characteristics of the resulting sample. The matters considered include data collection procedures, sample specification, statistical analysis and weighting, comparability with other databases, and limitations and constraints of the sample.

Data Collection Procedures

This survey of younger adult workers was conducted by telephone interviews between January and March of 1981. The population of interest was younger adult workers between the ages of twenty and thirty-four, who were working or seeking employment in the civilian labor force. Screening was conducted to ensure an oversampling of respondents who reported completing a vocational program when in high school. The Gallup Organization was chosen to select the final sample and to field-test and administer the questionnaire.

The actual sample telephone numbers used in this survey were produced for the Gallup Organization by Survey Sampling, Inc. which, through its computer files, identified all working banks in all telephone exchanges in the contiguous forty-eight states (Alaska and Hawaii are omitted). A sampling frame of 57 million households was constructed using currently operative area code and exchange combinations to eliminate nonresidential exchanges. The sampling methods were designed to yield a systematic random sample of telephone numbers, both listed and unlisted.

The actual sample was stratified to all counties so that the number of observations drawn within each county was proportional to that county's share of the total pool of households with telephones. Within counties, a working bank (or banks) was selected systematically, after a random start, by first summing the number of listed residential numbers in all the working banks, then dividing the sum by the desired quantity of numbers to establish an interval, and then cumulating the listings within the banks until the interval number was reached. Because each bank's chance of being selected is proportional to its share of listed homes, larger banks have a greater probability of selection than banks containing fewer listings. Within banks so selected, two random digits in the range 00-09 were generated and added to the bank, exchange, and area code to form a complete telephone number. As designed, the sample would be self-weighting except for a deliberate oversampling of vocational education students that will be described.

Once the telephone number was selected, the household was screened to determine if it had any respondents who were between twenty and thirty-four years of age and who were working or looking for work. If more than one individual who was a member of the target population resided in the household, the Kish Selection Tables (Kish 1965) were used to designate the individual to be interviewed.

Once a household member was selected, an initial call and three follow-up calls were made before abandoning the household. The calls were made on different days and at different hours of the day. All participation in the survey was voluntary, and the respondents were assured that the information provided would be kept confidential.

A sixty-one item fixed-format questionnaire* was created to measure the selected variables for the study. The questionnaire was designed to obtain background information about the respondent (ten questions), employment history (seven questions), experiences on first full-time and current jobs (twenty-seven questions), secondary and postsecondary schooling (twelve questions), and aspirations (five questions).

*A copy of the questionnaire is found in appendix A of the final report on which this publication is based. The interested reader should see Mertens and Gardner (1981).

The instrument was field-tested and revised. Nine pretest interviews were completed to check both the survey instrument items and the selection rules. The questionnaire took approximately fifteen to twenty minutes to administer by telephone. Up to ten additional minutes were spent initially introducing the survey and making sure the respondent was a member of the defined population for the study.

When the data were collected, the Gallup Organization coded the responses of all survey participants, along with appropriate technical specifications, on computer tape. Both the tape and the original questionnaires were delivered to the National Center.

Characteristics of the Sample

The sample consisted of 1,539 young adults between the ages of twenty and thirty-four who were identified—from preliminary screening questions—as being in the civilian labor force (i.e., working or looking for work and not in the armed forces, prison, or other residential institution). When asked about their high school program, 53 percent of the respondents classified themselves as vocational, 28 percent as academic, and 19 percent as general education participants. However, this distribution of former students by curriculum is not representative of the population. Vocational students were oversampled so that the sample would contain approximately 50 percent vocational curriculum completers. The random sampling procedures described earlier were used, and when the desired number of nonvocational graduates had been interviewed, only 20 percent of the desired number of former vocational students had been interviewed. To identify the additional vocational completers, an oversampling technique was introduced. The random sampling procedures described were continued, but interviews were conducted only with individuals who reported completion of a high school vocational program.

The analyses described here are based on 1,268 rather than 1,539 cases. Three considerations account for this attrition of the sample. First, in addition to the preliminary screening questions, the questionnaire specifically asked for the respondent's current labor force status. Despite the screening questions, interviews were conducted with some people who, when asked directly, said that they were neither employed nor looking for work. That is, they described their status as "going to school," "disabled," "housework," or "other." These respondents were dropped from subsequent analysis because they should have been excluded by the screening questions. This consideration reduced the sample by 158 cases. The large discrepancy between answers to screening and survey questions probably occurred because the screening questions were sometimes answered by a household member other than the eventual interviewee.

Second, because the selection process oversampled vocational curriculum *completers*, high school dropouts may be relatively overrepresented in the general education and college preparatory groups and underrepresented in the vocational group. The data suggest that such a problem could be present, since 91 percent of vocational students (but only 82 percent of general students) report having high school degrees or equivalency certificates. Hence, the analyses are restricted to those respondents who reported

Evidence on the relationship between high school curriculum and high school dropout rates is inconclusive. Some researchers have found no significant difference by curriculum (Bergstrand, Esser, and Nelson 1979). Others have found high dropout rates for vocational students (Nolfi et al. 1977). Yet another group reported differences within the same data set, depending on whether longitudinal or cross-sectional approaches were used. Those currently out of school who had been in a vocational curriculum have a higher proportion of high school graduates than do those who had been in a general curriculum; but among people in school in any particular year, vocational students are more likely than general students to drop out during the succeeding year (Grasso and Shea 1979). However, a recent study by Mertens, Seitz, and Cox (1982) found a small but significant positive association between staying in school and following a vocational curriculum.

having either a high school diploma or an equivalency certificate. After eliminating respondents who were outside the labor force, this second consideration reduced the sample by an additional sixty-eight respondents.

Third, another forty-five respondents were dropped because of implausible or inappropriate answers to questions about educational background, work history, or earnings. One respondent, for example, was an immigrant who had just arrived in the United States, had been educated entirely outside this country, and had no work experience in the United States prior to the survey. Several other respondents reported both very high hourly earnings and a high number of hours worked per week. It was clear from the interviewer's notes on the original questionnaires and from descriptions of the work performed that, although the earnings figures applied to hours actually worked, the hours-worked answers included time for preparation and search for work. These respondents were excluded because their answers could not be meaningfully compared with those of other respondents.

These exclusions do not substantially affect the distribution of the sample by race, sex, curriculum, or vocational program area. Racial minorities, women, and general curriculum students are slightly more numerous before the exclusions than after them, but the differences are small and should not influence results of the analysis.*

The principal objective of this project was to identify differences in outcomes attributable to high school curriculum. Because high school curriculum was identified through a self-reporting method, two questions were used to identify vocational participation more carefully. First, vocational respondents were asked if they had received a certificate of completion from their vocational program. Second, they were asked to indicate the amount of time they had spent in occupational courses as compared to other courses in high school.

This caution was necessary because of the hazards of using this method of identifying curriculum, which have been mentioned in several studies (e.g., Grasso and Shea 1979; Meyer 1981a). The most detailed study, to date, indicates the potential range of error in self-report (Campbell, Orth, and Seitz 1981). Using high school transcripts for respondents to the National Longitudinal Survey of Labor Market Experience, New Youth Cohort, these researchers specified vocational courses by reference to *Handbook VI* by Putnam and Chismore (1970) and identified degrees of individual participation in vocational education in terms of that coursework. Of the people who classified their curriculum as vocational, 7 percent had taken no vocational courses at all, and another 21 percent had only minimal involvement in vocational courses. On the other hand, 42 percent of self-classified general curriculum students and 22 percent of academic curriculum students showed a substantial enrollment in vocational courses. Thus, self-report may be very different from what an objective evaluation of course enrollment might indicate.

One should also note, however, that self-report may in one sense be a better indicator of curriculum involvement than is a more

*This modified sample of 1,268 respondents included 676 from a vocational curriculum, 218 from a general curriculum, 366 from an academic curriculum, and 8 respondents who did not identify a curriculum. Of the vocational students, 663 responded to the question that asked them to indicate a program area of specialty within vocational education. Twelve of the 663, however, did not identify themselves as falling within one of the six specific program areas. Thus, for analyses that use a curriculum classification but do not require program area, the analysis begins with 676 vocational students. If program area information is used, 663 vocational respondents are included in the analysis. If only the six specific program areas are used, only 651 vocational respondents are included. In each case, these figures represent the *maximum* number of vocational students. The number actually shown in any bivariate cross tabulation may be less than that number because of missing data on the other variable in the cross tabulation. For example, only 668 vocational students may be used in some analyses because 8 vocational students failed to identify either their race or their sex.

objective appraisal of courses. Self-report is probably an accurate reflection of the student's own perception of the purpose for taking certain courses. That intention may have more relevance for a student's subsequent career and educational decisions than does a listing of course enrollments.

Only slightly more than half of the vocational students reported receiving a certificate. Students in home economics were more likely to receive a certificate than were students in any other program area. However, the number of actual responses in that cell is small, and the sampling error of the proportion is correspondingly large. Business and office program students, on the other hand, seem much less likely than in any other program area to receive a certificate. This result may reflect a substantial number of students who were not classified as vocational students by their schools but who took enough business and office courses to consider themselves to be vocational students.

In terms of time spent on job-related courses, about one-quarter of the self-classified vocational students may be better thought of as general or academic curriculum students, since they spent relatively less time in job-related courses.

Respondents who identified their high school program as vocational were asked to identify the vocational program area in which they were enrolled. Since the members of the sample left school between 1962 and 1978, there are no single-year enrollment figures to which they can be compared. Moreover, the sample percentage enrollments by program area were compared to the national average enrollments between 1971 and 1977 (National Center for Research in Vocational Education 1979). In both this and the national sample, business/office and trade/industry showed the largest enrollments. However, this sample included 52 percent business/office completers, whereas the National Center study reported only 32 percent.* This overrepresentation in the business and office area resulted in an underrepresentation in other program areas, especially in agriculture and health. The effects of errors in estimating the distribution of enrollment by program area on conclusions drawn from the analysis are discussed next in conjunction with the specific conclusions affected.

Relationships between Curriculum or Program and Intervening Variables

This report focuses on the labor market and educational effects of high school vocational education. However, high school curriculum is only one of many factors that influence earnings, occupational attainment, job satisfaction, unemployment, college attendance, and educational aspirations. Some of these factors affect outcomes in ways that are unrelated to high school curriculum. Others affect curriculum choice or are themselves affected by curriculum or by a third variable that also influences curriculum choice. Identifying the effects of curriculum requires an understanding of the relationships between curriculum and these other complementary or intervening variables that affect outcomes. This section discusses these relationships as they are manifested in the sample.

Approximately 85 percent of the respondents in the sample are white. In 1980, about 87 percent of the civilian labor force in the age range twenty to thirty-four was white (U.S. Bureau of the Census 1981). The minority respondents in the survey total about 15 percent of the overall sample. Sixty-eight percent of them are black, 21 percent Hispanic, 6 percent Oriental, and 5 percent other racial or ethnic groups.

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*Grasso has suggested in comments on an early draft of this report that at least part of this difference may be attributable to the inclusion of "general business" graduates who might more properly be categorized as general curriculum students. He also pointed out that even the national estimates shown in table 2.6 may contain fairly large errors in classification of students by program area.

Academic and general curricula have substantially larger proportions of white males—and smaller proportions of white females than the sample as a whole. A relatively smaller percentage of minority males and females were in an academic curriculum than were in the sample. The nonacademic minority males were more likely to be in the vocational group than in the general group, whereas the reverse holds for nonacademic minority females.

The distribution of the vocational subsample by program area, race, and sex was also analyzed. Members of racial minority groups are more likely to classify themselves as vocational, but compared to recent enrollment data they appear to be underrepresented in this sample. Almost 17 percent of the respondents in the vocational group are nonwhite, compared to 15 percent of the full sample. Vocational education enrollment figures for 1977 indicate approximately 23 percent of vocational education students are nonwhite (National Center for Research in Vocational Education 1979). Respondents in the sample attended high school before 1977. Adequate historical data are not available, but it is likely that minority enrollments in vocational education have increased as the seventies progressed and greater emphasis on equity was stressed.

The male-dominated program areas are agriculture and trade and industry. The female-dominated areas are health, home economics, and business and office. The distributive education area includes about 40 percent males and 60 percent females, all of whom are white. Of the 112 minority vocational completers, 39 percent are in trade and industry, and 41 percent are in the business and office areas.

The socioeconomic status (SES) of the respondent's family is represented by a composite variable that uses three indicators: reading material in the home during high school, years of schooling of the family's chief wage earner, and the Duncan prestige score of the chief wage earner's job while the respondent was in high school.

The mean SES levels were analyzed by curriculum groups. This variable is not as discriminating as one might wish, since very few of the respondents fall in the very low or very high SES categories. Although a great many more academic curriculum students are from high SES families, the differences in percentages from lower SES families between academic curriculum and vocational students are not large. The percentages of below average respondents in each curriculum group are 13 percent of vocational, 20 percent of general, and 8 percent of academic. The percentages of above average respondents are about 9 percent for both vocational and general curriculum students, and 27 percent for academic curriculum students.

The SES levels by vocational program area were also analyzed. The below average SES respondents are most frequently represented in the areas of home economics, distributive education, and agriculture.

The lack of discriminatory power of the SES index suggests that the occupation of the chief wage earner may, by itself, be more revealing than the composite variable. The distribution of the respondents by chief wage earner's occupation and curriculum was also analyzed. The largest occupational group represented is crafts (23 percent of all respondents). Professional, managerial, and operative categories each account for about 14 percent of respondents. Sales, clerical, laborer, farm, and service groups each account for about 6 percent.

Academic students are more likely than the entire sample to have chief wage earners in their households who are in professional, managerial, or sales occupations. Vocational students are relatively less likely to come from families associated with professional or managerial jobs and are more likely to come from families associated with operative, laborer, farm, and service jobs. Compared to vocational students, general students are less likely to come from families with chief wage earners in white-collar occupations. The

exception is that general students are relatively more likely than are vocational students to be children of a chief wage earner in a managerial occupation (but not so much more likely as to offset the predominance of the other occupations). Finally, chief wage earners for general students are more likely than for vocational or academic students to work as craftspersons, somewhat more likely to work as operatives or laborers, and less likely to be in service jobs.

The indicator of locale for participants is based on their residence at the time of the survey. Residence or nonresidence in a Standard Metropolitan Statistical Area designates the locale as metropolitan or nonmetropolitan. The majority of the respondents are located in a metropolitan area. According to the 1980 census, 73 percent of the nation's population resides in metropolitan areas and 27 percent in nonmetropolitan. In this respect, this sample is representative of the nation.

About 10 percent more of the vocational and general education respondents than of the academic respondents are from rural areas. In most of the vocational program areas, however, the majority of the respondents reside in metropolitan areas. As expected, a relatively larger proportion of agriculture students reside in nonmetropolitan areas.

The vocational, academic, and general education groups differ markedly by age distribution. A greater proportion of the younger respondents participated in vocational education programs. Only 16 percent of those in vocational education are between the ages of thirty-two and thirty-four, whereas about 25 percent are between the ages of nineteen to twenty-two. On the other hand, fewer of the academic respondents are in the younger age ranges (11 percent of the nineteen- to twenty-two-year-olds and 24 percent of the thirty-two- to thirty-four-year-olds). Most likely, this pattern reflects the sample selection screening questions that required respondents to be in the labor force. That is, younger academic graduates are more likely to be attending college full-time and to be out of the labor force. However, it may also reflect the increased access to vocational education, since the 1963 legislation authorized spending federal monies for facilities and equipment.

In this sample, the number of students in nearly all of the vocational program areas increased during the time between enrollment of the thirty-two- to thirty-four-year-old age group and the nineteen- to twenty-two-year-old age group. The only exception to this increase is students enrolled in the business/office area. For these students, the enrollment has remained nearly the same.

The marital status of the young adult workers was also investigated. In general, a smaller percentage of male vocational education representatives are married as compared to their general and academic counterparts. Female vocational and general education representatives are more likely to be married than their academic peers.

When asked about physical limitations, only 35 of a total of 1,240 reported some type of physical limitation. This low number (less than 3 percent) probably reflects the fact that many handicapped people are not in the labor force. Thus, this sample is not representative of the population of persons with physical limitations. The majority of the respondents who did report physical limitations are orthopedically impaired. As for the vocational program areas, the trade/industry and business/office programs enrolled 80 percent of the vocational respondents with physical limitations. Any generalizations about handicapped participants must be made cautiously because of the very small sample size.

Since placement in a training-related job is one of the criteria of success in a vocational program, an important aspect of any vocational program is the placement assistance provided to students. Overall, 19 percent of the students in all vocational program areas report receiving assistance in finding their first job. This figure exceeds the 4 percent of academic and 6 percent of general respondents who report receiving assistance. The health participants report the highest rate and agricultural

students report the lowest rate of receiving assistance; however, some portion of agriculture students may have found their first job on their own or on their family's farms or agribusinesses and would not have required teacher placement assistance.

In general, fewer than 25 percent of the students in the academic and general education curriculum areas received occupational information. However, the vocational program areas did a much better job in providing students with such information. On the whole, about one-half of all vocational students were given some type of occupational information. Home economics students most often indicate receiving information, whereas the respondents in health occupations least often report having received information.

The profile of vocational students that emerges from the survey agrees with the patterns found in other studies and can be summarized as follows: Vocational students are more likely than general or academic students to be white females or black males. They are less likely than academic students to come from families with high socioeconomic status, and less likely than general curriculum students to come from low socioeconomic status families. Males are less likely to be married. Like their general curriculum counterparts, the vocational students are more likely than academic students to live in a rural area. And they are more likely than either academic or general students to have received occupational information in high school or assistance from teachers in finding jobs. That is, there are substantial differences across curriculum groups with respect to at least several factors that affect labor market experiences and postsecondary education patterns. Thus, comparison of labor market experiences or educational attainment by curriculum group must control for the impact of these other factors if accurate conclusions are to be drawn about the effects of curriculum. The analyses conducted in this research were chosen because they permit that kind of control.

Weighting and Methods of Analysis

This reduced sample of 1,268 former students was examined using two principal techniques. The first approach was to look at unweighted cross tabulations of the data. Because vocational students were oversampled, unweighted cross tabulations that combine cases across curriculum would not give accurate estimates of population frequencies. Weights could be introduced to make such cross tabulations representative of high school graduates in the civilian labor force. Such weights were not used, however, because most of the tables show a stratification of cases either by curriculum or by vocational program area. The relevant comparisons can be made among curriculum groups without any need for weighting.

Cross tabulations reveal broad, surface relationships between curricula or programs and either individual characteristics or outcome measures. However, controlling the relationships for the influence of other variables is difficult when only cross tabulations are used. Multiple regression analysis is employed to analyze those more complex interrelationships and to estimate the partial relationship between two variables while controlling for the influence of other variables.

As with the cross tabulations, the regression analyses are unweighted. If regression models are properly specified, weighting to allow for a stratified sample is unnecessary. Other forms of adjustment in specification are necessary for some of the analyses.

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